Datos del problema

$$P_1 = 100 - Q_1$$
$$P_2 = 80 - Q_2$$
$$CT = 20Q$$

$$Como:\ Q = Q_1 + Q_2,\ entonces:\ CT = 20(Q_1 + Q_2)$$

$$Por\ tanto,\ el\ costo\ marginal\ es:\ \ CMg = 20$$

<u>Regla de maximización</u>

$$En\ discriminación\ de\ precios\ de\ tercer\ grado:$$

$$IMg_1 = IMg_2 = CMg$$

$$Es\ decir:\ IMg1 = 20\ y\ IMg_2 = 20$$

<u>Segmento 1</u>

$$Demanda:\ P_1 = 100 - Q_1$$

$$Ingreso\ total: IT_1 = P_1Q_1 \Rightarrow IT_1 = (100 - Q_1)Q_1 \Rightarrow IT_1 = 100Q_1 - Q_1^2$$

$$Ingreso\ marginal: IMg_1 = \frac{dIT_1}{dQ_1} \Rightarrow IMg_1 = 100 - 2Q_1$$

$$Igualamos\ con\ el\ costo\ marginal:$$

$$100 - 2Q_1 = 20 \Rightarrow 80 = 2Q_1 \Rightarrow Q_1^* = 40$$

$$Precio:$$

$$P_1 = 100 - Q_1 \Rightarrow P_1 = 100 - 40 \Rightarrow P_1^* = 60$$

$$Entonces:\ \boxed{Q_1^* = 40},\ \boxed{P_1^* = 60}$$

<u>Segmento 2</u>

$$Demanda: P_2 = 80 - Q_2$$

$$Ingreso\ total: IT_2 = P_2Q_2$$

$$IT_2 = (80 - Q_2)Q_2$$

$$IT_2 = 80Q_2 - Q_2^2$$

$$Ingreso\ marginal:$$

$$IMg_2 = \frac{dIT_2}{dQ_2}$$

$$IMg_2 = 80 - 2Q_2$$

Igualamos con el costo marginal :

$$80 - 2Q_2 = 20 \Rightarrow 60 = 2Q_2 \Rightarrow Q_2^* = 30$$

Precio :

$$P_2 = 80 - Q_2 \Rightarrow P_2 = 80 - 30 \Rightarrow P_2^* = 50$$

$$\text{Entonces}: \boxed{Q_2^* = 30}, \ \boxed{P_2^* = 50}$$

<u>Beneficio obtenido</u>

Ingreso total del segmento 1:

$$IT_1 = P_1Q_1 \Rightarrow IT_1 = 60(40) \Rightarrow IT_1 = 2400$$

Ingreso total del segmento 2:

$$IT_2 = P_2Q_2 \Rightarrow IT_2 = 50(30) \Rightarrow IT_2 = 1500$$

Ingreso total :

$$IT = IT1 + IT2 \Rightarrow IT = 2400 + 1500 \Rightarrow IT = 3900$$

Cantidad total :

$$Q = 40 + 30 \Rightarrow Q = 40 + 30 \Rightarrow Q = 70$$

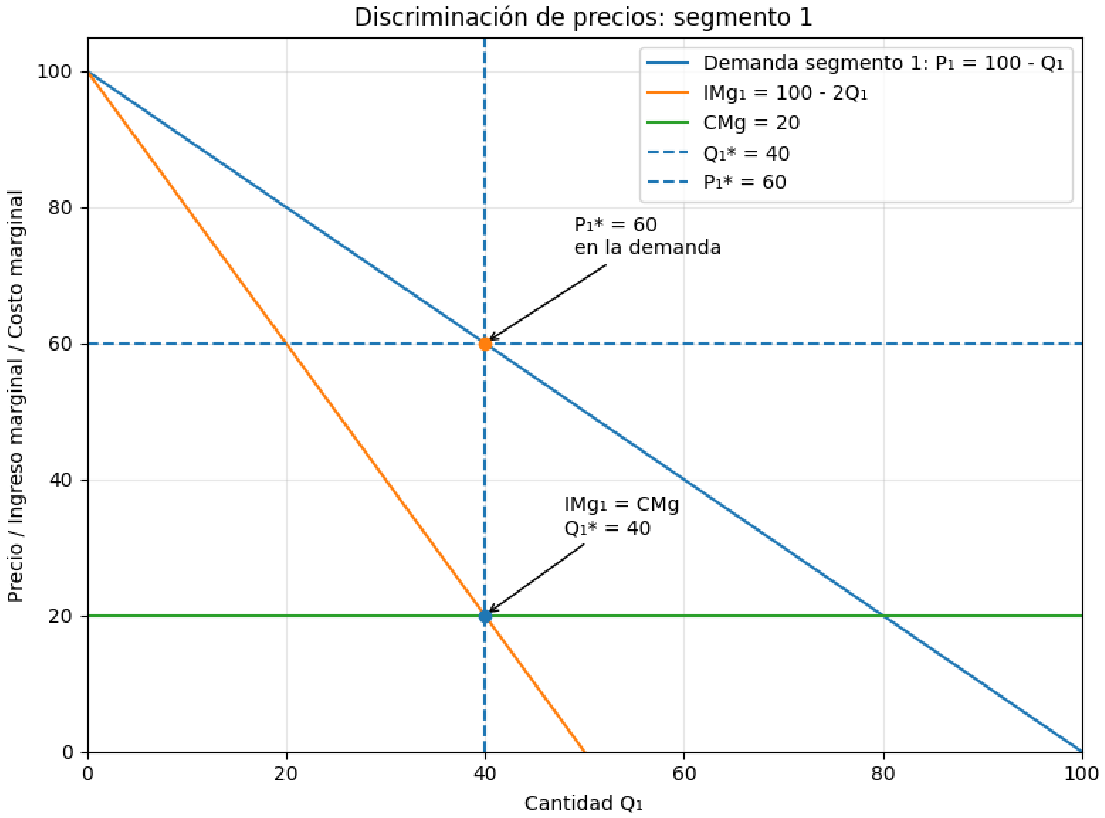
Costo total :

$$CT = 20Q \Rightarrow CT = 20(70) \Rightarrow CT = 1400$$

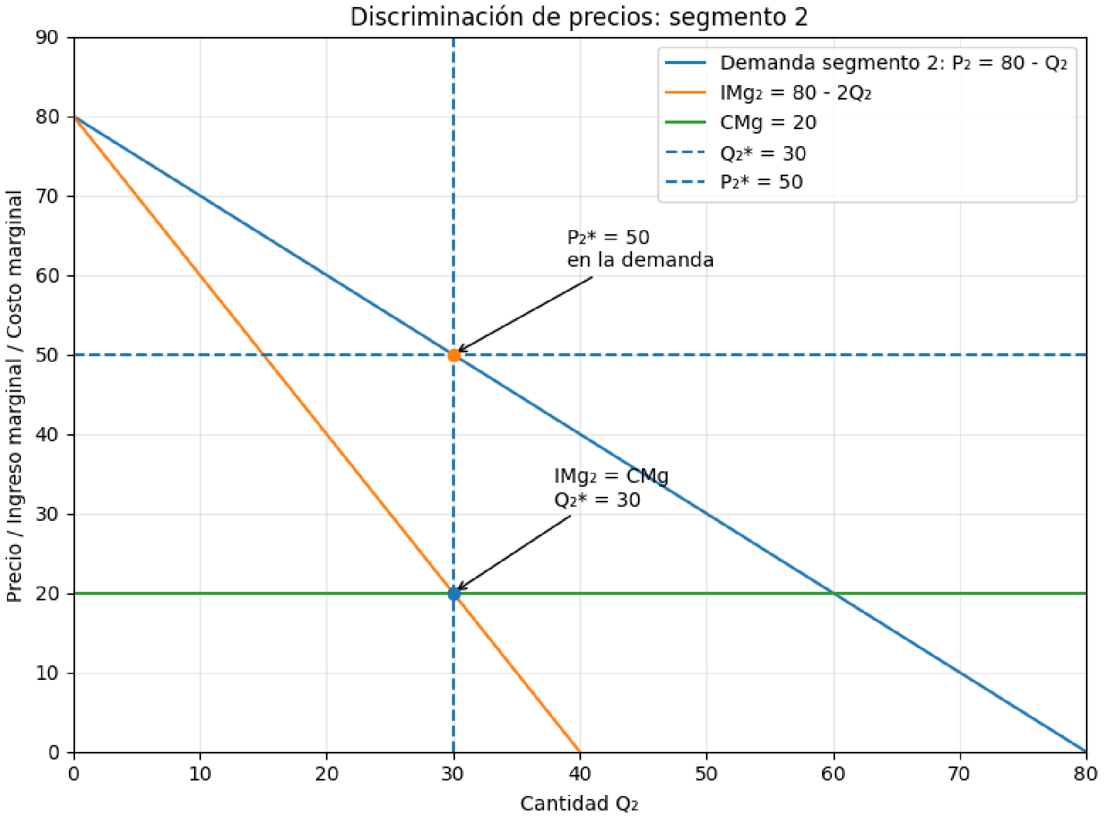
Beneficio :

$$\pi = IT - CT \Rightarrow \pi = 3900 - 1400 \Rightarrow \boxed{\pi = 2500}$$

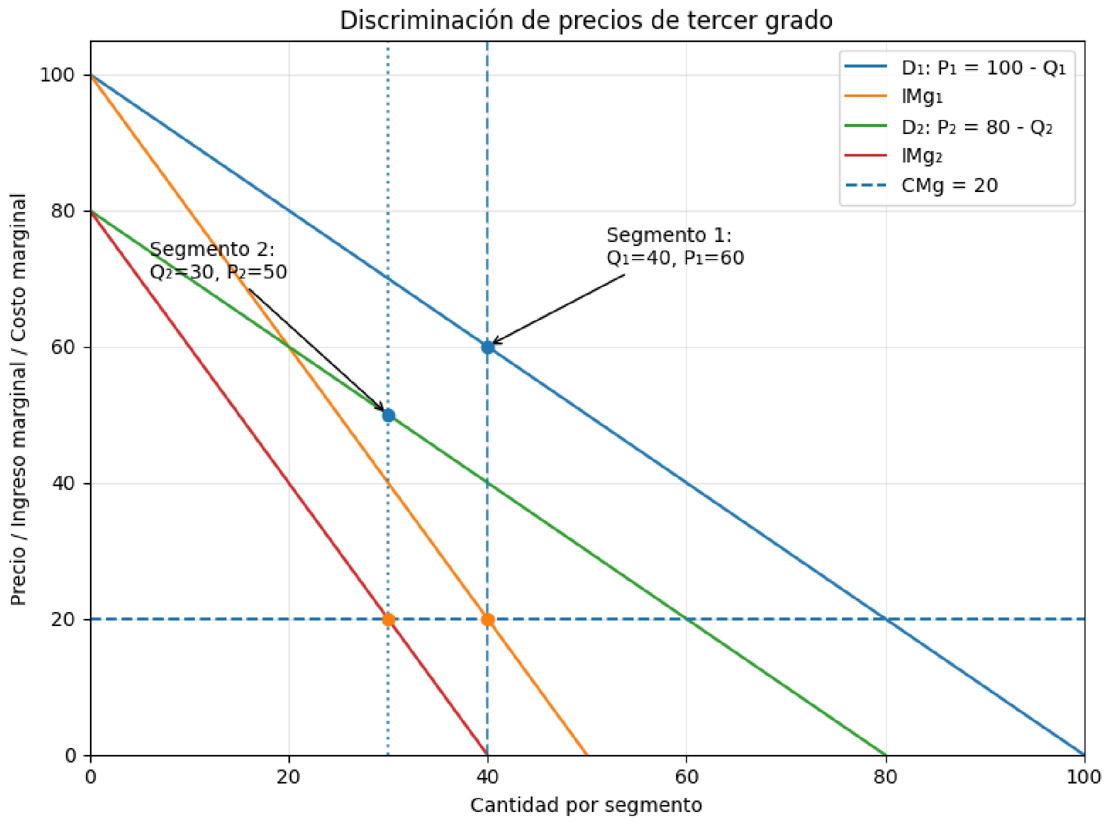
Gráficos



Discriminación de precios: segmento 1
Demanda segmento 1: P₁ = 100 - Q₁
IMg₁ = 100 - 2Q₁
CMg = 20
Q₁* = 40
P₁* = 60
P₁* = 60
en la demanda
IMg₁ = CMg
Q₁* = 40
Precio / Ingreso marginal / Costo marginal
Cantidad Q₁



Discriminación de precios: segmento 2
Demanda segmento 2: P₂ = 80 - Q₂
IMg₂ = 80 - 2Q₂
CMg = 20
Q₂* = 30
P₂* = 50
P₂* = 50
en la demanda
IMg₂ = CMg
Q₂* = 30
Precio / Ingreso marginal / Costo marginal
Cantidad Q₂


Discriminación de precios de tercer grado
D₁: P₁ = 100 - Q₁
IMg₁
D₂: P₂ = 80 - Q₂
IMg₂
CMg = 20
Segmento 1:
Q₁=40, P₁=60
Segmento 2:
Q₂=30, P₂=50
Precio / Ingreso marginal / Costo marginal
Cantidad por segmento
0
20
40
60
80
100